

PME RESEARCH LABORATORY, October 1977

## MONTHLY PROGRESS REPORT, OCTOBER 1977

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HIGHLIGHTS OF ACTIVITIES (H. Gaisch)

Less time was spent on travelling this month and more time was devoted to running the Research Department. Emphasis was put, in particular, on the support work for the NINO Project and on getting the Project on Smoker Satisfaction off the ground.

On Monday, October 3rd : first of all, R & D meeting chaired by Dr. Häusermann followed by a meeting with Dr. Hach and Dr. Béringer on patents in conjunction with sheet processes.

On Wednesday, October 5th : meeting with Professors C. and R. Leuchtenberger in Lausanne and Morges. Review of the results of the biologic research going on in Cologne. The screening of products in the short-term cytotoxicity test is satisfactory and the results are very similar to the ones obtained earlier in Lausanne. There is also a good chance that the long-term transformation test can be shortened considerably. The idea being that after a few weeks' cultivation the cells would be already implanted into nude mice before they show the characteristic appearance of transformed cells in culture.

On Thursday, October 6th : repeated telephone calls to Imperial Tobacco and to Mr. Holtzman, New York : the I.C.O.S.I Working Party on medical effects should put more emphasis on passive smoking.

On Friday, October 7th : visit by Mr. G. Bible of PME Lausanne to Research. "Tour d'horizon" on what is going on.

Further telephone call with Mr. Holtzman on the passive smoking issue.

On Monday, October 10th : meeting HGA-N. Möller on Project HELMUT.

On Wednesday, October 12th : telephone report by Dr. Traber : he is very pleased with the soft agar method and agglutination tests in his attempts to speed-up long-term transformation experiments in culture. This is in addition to the nude mice experiments.

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On Thursday, October 13th : replay of the recorded anti-smoking film of the previous night in the presence of Mr. Stoop. Preliminary opinion : probably not very dangerous.

Visit by Professors C. and R. Leuchtenberger to Neuchâtel. Discussion of the on-going research. Preparation of the forthcoming visit to Cologne.

On Friday, October 14th : visit by Mr. G. Gellatly of R & D Richmond. Discussion of problems connected with Project NINO.

On Monday, October 17th : urgent investigation by GLC of a large number of samples of MLF base flavour. Detection of additional peaks in a large number of samples. This seemed to be correlated to the off-flavour observed in manufacturing.

On Tuesday, October 18th : continuation of the flavour analyses of the previous day. Second talk with G. Gellatly on Project NINO.

On Wednesday, October 19th : beetle infestation problem in PME Headquarters. Dr. Michel was despatched to lend aid to Leaf Department on the spot.

On Thursday, October 20th : meeting in Headquarters in Lausanne together with Mr. Schedel : visit by a medical doctor who had requested a publicity contract for his two thoroughbreds. It was regretfully pointed out that any sponsorship would be against the rules governing cigarette advertising in Switzerland. His ideas of calling the horses Marlboro-1 and Marlboro-2 certainly flattered us. We questioned whether he did not think that he might have trouble with medical doctors making publicity for cigarettes, he answered : "No - why ?".

Evening meeting of FTR management with representatives of unions and staff associations at "Les Rasses".

On Monday, October 24th : R & D meeting chaired in the absence of MAH by HGA. Discussion of holiday arrangements and plans for laboratory extensions.

On Tuesday, October 25th : morning meeting of Research chaired by HGA in the presence of CLJ, WAF, JAB, JOA and JBE replacing JMD who was ill. Budget : the recent 650 application for the supplementary instrumentation in support of

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Project NINO being approved, there was agreement that we will be staying within the planned budget without any difficulties. Filter research : CLJ reported on interesting results with salcomine, NO reduction !  
Space : JMV's laboratory for measurements of human responses to smoke has got to be air-conditioned otherwise no reproducible experiments are possible. We shall need an additional laboratory for GLC analysis of cigarette smoke. There is absolutely no place to put the required smoking machine plus the chromatograph.

Afternoon meeting with Mr. Murray and Mr. Isenring on I.C.O.S.I. HGA suggested what line might be desirable to be followed by PME in the discussions.

On Thursday, October 27th : visit by Mr. Haley of NSM Ltd. to Neuchâtel. According to policy briefing from Lausanne, the cooperation should be carried on but very low-keyed.

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HIGHLIGHTS OF ACTIVITIES (Product Research)

From October 4th to 7th, Y. Genoud (YVG) took part in a training programme on gas chromatography in Geneva.

On Thursday, October 20th and Friday, October 21st, C. Jeanneret (CLJ) attended the autumn meeting of the Swiss Society for Social and Preventive Medicine ("Journées d'automne 1977 de la Société suisse de médecine sociale et préventive") in Lucerne. In particular, one important point in their general assembly was devoted to the problem of revising art. 420-OdA (ordinance related to tobacco and tobacco products).

On Friday, October 28th, CLJ gave a talk to the PME Leaf Department in Lausanne on "Smoke Impact".

Person in charge : C. Jeanneret

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## 17. SURFACE CHEMISTRY OF ADSORBENTS - FILTER RESEARCH

### 1. Surface Properties of Adsorbents

The effect on the surface properties of adsorbents of a solvent which could be used for impregnation is going on (1). For the time being, water is used and the conditions allowing for the complete evaporation of the solvent are being explored. In particular, we are determining the lowest possible temperature which allows, after water immersion, the adsorbent to re-attain the comparable surface characteristics (surface area and porosity).

### 2. Filter Research

Ion-Exchange Resins : Last month (2) we reported that an ion-exchange resin (Dowex MWA-1 DRY) had shown a greater HCN retention capacity than had charcoal. A combination of 50% charcoal and 50% resin (volume/volume) in a filter did not improve the HCN retention as compared with the 100% charcoal filter (Table 1).

Salcomine : First experiments made on salcomine did not allow us to reduce NO more than 15 - 20%, even with a salcomine received from Eastman Kodak (1) (G. Morie), and impregnated on charcoal here. Recently we received another small sample of salcomine but which had already been impregnated on CPG charcoal (10% salcomine). For the NO determination, 75 mg of this material was put into PSP-filters. As control, 75 mg of a normal CPG charcoal was used. Analytical results showed a 40% reduction (Table 2).

Other Adsorbents : In similar conditions we have compared the filtration properties of cocoanut charcoal (CA-85), of silicagel used in our filter (SG-23) and silicagel used in the smoke laboratory to trap HCN and aldehydes in the gas-phase (SG-41). The granule size of each adsorbent was between 0.63 mm and 1 mm. The results obtained are reported in Table 3 and show, once more, the superiority of charcoal as against silicagel, as well as the superiority of SG-41 as against SG-23. The surface properties of SG-41 are being measured.

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### 3. Gas Chromatography

In order to determine which substances are retained in the adsorbent and to what extent they are retained, a programme has been instigated to develop a method to recover the adsorbed species from the charcoal and to analyse them by GC. The separation procedure was based on the one described by Ceschini and Cham (3, 4) and a good separation of the gas phase of smoke was obtained. The adsorbed species were recovered by vacuum, heating and direct trapping on a cooled porapak (or tenax) pre-column. The development of the method has to be continued.

#### References :

- (1) PME Monthly Report, July-August 1977, pp. 5-6
- (2) PME Monthly Report, September 1977, p. 5
- (3) Ceschini, P. and Cham, D., Beiträge Tabakforsch. 7, pp. 294-301 (1974)
- (4) Ceschini, P. and Lafaye, A., Beiträge Tabakforsch. 8, pp. 378-381 (1976).

Person in charge : P. Ghiste  
Co-worker : J.L. Favre

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TABLE 1

	Control 100% charcoal CA-85	Trial 50% charcoal CA-85 50% resin MWA-1	$\Delta$ %
RTD (mm H <sub>2</sub> O)	109 $\pm$ 5	114 $\pm$ 5	-
DPM (mg/cig)	16.8 $\pm$ 0.7	16.9 $\pm$ 0.5	-
SN (mg/cig)	1.02 $\pm$ 0.03	0.99 $\pm$ 0.02	-
Puff number	8.6 $\pm$ 0.3	8.5 $\pm$ 0.2	-
Phenols ( $\mu$ g/cig)	45 $\pm$ 2	43 $\pm$ 3	-
HCN ( $\mu$ g/cig)	75 $\pm$ 8	73 $\pm$ 8	-
Aldehydes (mg/cig)	0.91 $\pm$ 0.04	1.12 $\pm$ 0.05	+ 21

TABLE 2

	Control CPG charcoal	Trial 10% salcomine on CPG charcoal	$\Delta$ %
CO (mg/cig)	14.8	14.6	-
NO (mg/cig)	0.28	0.16	- 43

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TABLE 3

	Charcoal CA-85	Silicagel SG-23	Silicagel SG-41
RTD (mm H <sub>2</sub> O)	109 ± 5	112 ± 4	119 ± 4
DPM (mg/cig)	16.8 ± 0.7	17.0 ± 0.3	16.5 ± 0.4
SN (mg/cig)	1.02 ± 0.03	0.98 ± 0.03	0.98 ± 0.05
Puff number	8.6 ± 0.3	8.3 ± 0.2	8.3 ± 0.2
Phenols (µg/cig)	45 ± 2	43 ± 3	41 ± 1
HCN (µg/cig)	75 ± 8	181 ± 6	146 ± 10
Aldehydes (mg/cig)	0.91 ± 0.04	1.35 ± 0.02	1.12 ± 0.05

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26. SPECIAL ANALYTICAL SERVICES

Due to the vacation of Dr. W. Fink and the vacation as well as extended training programme attended by Mr. F. Moser, progress in work will be reported on next month.

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27. MICROBIOLOGY

Due to the illness of the person in charge of Microbiology, Mr. J.M. Ducommun, the account of progress made in this field will be given in next month's report.

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### 30. SMOKE CHEMISTRY

#### NO-Analyzer

The special 7 KV transformers for the ozone generator were received on October 17th but they were found to be defective due to bad construction. They have been returned to the supplier.

#### Miscellaneous

- A thermostatic tubular oven has been made to link the gas chromatograph to the Thermo-Energy Analyzer for nitrosamine analysis.
- A device has been outlined whose purpose is to enable the recording of the puff profile in the smoke experiments related to the project "Smoker Satisfaction". Its specifications have been transmitted to the electronics workshop for designing and construction.
- The project concerning a frequency converter, intended for driving the motor on Battelle-type pumps (for ISH determination) has also been submitted to the electronics workshop for construction.

Person in charge : J. Bourquin

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32. SMOKER SATISFACTION (formerly Smoke Impact)

In order to avoid confusion this project has been renamed.

The ultimate objective of the project is to determine if and in what way the satisfaction derived by a smoker depends on the delivery of specific smoke components and how this knowledge could be applied in the development of satisfying low "delivery" cigarettes.

The immediate goal of this project is to determine the physiological effect of the nicotine contained in cigarette smoke in association with the subjective satisfaction of the smoker.

This month was spent getting used to the equipment, determining in what areas the analyses will be undertaken as well as what are the ideal conditions under which the subject-volunteers should be tested.

The different parameters currently being analysed are : ECG, cardiac rhythm, temperature and skin resistance. So as to obtain a good interpretation of the results, one must work in a stable environment (temperature, humidity). The persons tested should abstain from drinking cold beverages (in fact the drinking of such beverages brings on an important decrease in skin temperature), or anything containing caffeine such as coffee, tea, etc. (caffeine = theine) which lowers the temperature in the extremities as greatly if not greater than does the nicotine contained in cigarette smoke.

To avoid psychological or physiological problems due to the restraint involved, the tests are effected as early in the morning as possible.

Person in charge : J.M. Villard

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#### 84. PRODUCT RESEARCH

##### 1. Experimental Cigarettes

- Series INB-1 (effect of filter) - The analytical results showed that the tobacco used in cigarette INB-11 and the tobacco used in cigarette INB-12 are different although the same tobacco was planned and prepared. Analytical differences are too important to use these cigarettes. A new cigarette series has to be prepared.
- Series INB-3 (spiking) - The cigarettes were sent to Cologne.
- Series INB-4 (dilution) - The cigarettes were sent to Cologne.
- Series INB-5 (1) - These cigarettes will be sent to Cologne shortly.
- Project JORAN (1) - This project will be undertaken in close collaboration with Product Development (Mr. Toimil).

##### Reference

- (1) Monthly Report, September 1977, p. 19

Person in charge : C. Jeanneret

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#### 84. PRODUCT RESEARCH

##### 2. Gas Chromatography on Capillary Columns

Assistance was again given to Chemical Services (WAF) for nitrosamines determination by GC-TEA.

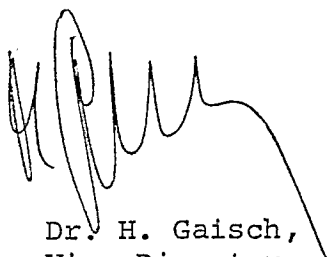
For the smoke gas phase a 50 m long capillary column was prepared and coated with UCON 50 HB 280X under well-defined conditions. The tests have shown a good reproducibility always bearing in mind the fact that the apparatus' electronic reliability is none too good. Using a test mixture containing 27 products, the following products have been identified :

- 1) Acetaldehyde
- 2) Isoprene
- 3) 1,2-Pentadiene
- 4) Propanol
- 5) Furane
- 6) Acetone
- 7) Acroleine
- 8) Methyl-2-Furane
- 9) Methanol
- 10) Methyl-Ethyl-Ketone
- 11) Benzene
- 12) Acetonitrile
- 13) Methyl-3-Butanol
- 14) Diacetyl
- 15) Propionitrile
- 16) Pentanone-2
- 17) Pentanone-3
- 18) Pentanal
- 19) Butenal-2
- 20) Toluene
- 21) Ethyl-Benzene
- 22) Cyclopentanone
- 23) p-Xylene
- 24) m-Xylene
- 25) o-Xylene
- 26) cumene
- 27) limonene

Person in charge : Y. Genoud

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